

RECEIVED  
CENTRAL FAX CENTER

SEP 23 2005

## UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT(S)	Kumar, et al.	GROUP ART UNIT:	2662
APPLN. NO.:	09/975,353	EXAMINER:	Hong Sol Cho
FILED:	10/11/01	Confirmation No.	9535
TITLE:	USE OF IP-MULTICAST TECHNOLOGY FOR 2-PARTY CALLS IN MOBILE COMMUNICATION NETWORKS		

---

**INVENTOR'S DECLARATION UNDER 37 C.F.R. § 1.131**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This declaration is to establish conception of the subject matter of the present application in the United States or other provincial region permitted by the Rule prior to the effective date of United States Patent Publication No. US 2002/0026525 filed on 3 April 2001 (with an effective date of 4 April 2000) entitled "Supporting Mobile Hosts on an Internet Protocol Network" to Armitage (Armitage patent) and diligence to the filing of the provisional patent application for which the present application claims priority (constructive reduction to practice) from a time prior to the effective date of the Armitage patent, 4 April 2000, to the filing date, 30 August 2001, of the provisional patent application for which the instant patent application claims priority.

In support of this declaration, I, Surender Kumar of Naperville, Illinois, declare and sayeth the following:

That the claimed subject matter of the instant patent application stands subject to a rejection under 35 U.S.C. 102(e) for anticipation and 35 U.S.C. 103(a) for obviousness by United States Patent Publication No. US 2002/0026525 filed on 3 April 2001 entitled "Supporting Mobile Hosts on an Internet Protocol Network";

That the claimed subject matter of the instant patent application was conceived in the United States or other provincial region permitted by the Rule before the effective

date (4 April 2000) of the Armitage patent in the course of employment by Motorola Inc., the assignee of record at REEL/FRAME 012256/0520;

That the claimed subject matter of the instant patent application was the subject of a written invention disclosure (ID No. CM04624H) prepared and submitted, with diligence, to a patent committee of Motorola Inc., the assignee of the instant patent application, for the purpose of documenting and evaluating invention disclosures for patent protection;

That, after consideration of the written invention disclosure, ID No. CM04624H, by the Motorola Inc. patent committee, a patent specification and drawings were prepared by or on behalf of an attorney or agent of the assignee based on the subject matter of the written invention disclosure, ID No. CM04624H, and that the patent specification and drawings were reviewed and completed with diligence from a time prior to the 4 April 2000 effective date of the Armitage patent to the filing date of the provisional patent application for which the instant United States patent application claims priority where the provisional patent application was filed on 30 August 2001;

That the attached written invention disclosure, ID No. CM04624H, is a true copy of the original written invention disclosure on which the instant patent application is based;

That the attached copies are true copies of original documents on which the instant patent application is based and submitted herewith are the following copies:

- a summary of discussions from an advanced inventing session discussing the claimed subject matter,
- a screenshot of files in a folder having an electronic copy of the disclosure,
- page 34 of a Technical Requirements Specification of a product incorporating claimed subject matter in the instant patent application,
- a screenshot of many emails regarding the preparation of the instant patent application, and
- three emails from the screenshot of many emails regarding the preparation of the instant patent application.

That the redacted conception date (MPEP 715.07) on the attached written invention disclosure, ID No. CM04624H, is before the 4 April 2000 effective date of the Armitage patent; and

That all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

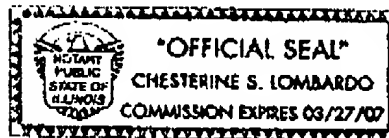
SIGNATURE:

Surender Kumar 09/23/05  
Surender KUMAR Date

STATE OF ILLINOIS  
COUNTY OF COOK

This instrument was acknowledged before me by Surender KUMAR on the 23<sup>rd</sup> day of September, 2005.

Chesterine Lombardo  
Chesterine Lombardo, Notary Public



MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)

**MOTOROLA**

Disclosure for Patent Committee Review  
Submitted Pursuant to Employee Agreement

## DISCLOSURE TYPE:

SHORT FORM ☐EXPANDED ☒

When using the short form (single page), the review committee may request additional information before reaching a decision.

Use additional pages in the expanded form if you feel more information will be necessary for the committee to reach a decision.



Disclosure Number CM046711	Date
Division(s):	
Patent Committee Action	

1. Title of Invention: Use of IP Multicast technology for a 2 party private Call in Mobile Communication networks

1a. Key Words: IP multicast, 2 party Private Call

2. Primary or contact point inventor(s) Use your full first, middle and last names. Use page 2 of the expanded disclosure form for contributing inventors.

1/ Surrender Kumar	Signature: <i>Surrender Kumar</i>	DQ503	IL02-1232	847-576-5091
Indian	343-90-0464	2554 Briar Trail Apt 206	Schaumburg	IL 60173
2/ Mark Shaughnessy	Signature: <i>Mark Shaughnessy</i>	DQ503	IL02-1232	847-576-0349
USA	342-54-7085	1371 Notting Hill Rd	Algonquin	IL 60102
3/ James E. Mathis	Signature: <i>James E. Mathis</i>	DQ503	IL02-1242	847-576-0674
USA	530-42-9199	28448 W Heritage Oak Rd	Barrington	IL 60010

3. What was the problem(s) to be solved by the invention or what was the need(s) for the invention:

Today's systems use centralized connection and mobility management functionality. Recently, the concept of distributing connection and mobility processing using IP, IP multicast and other Internet technologies has been proposed for a system architecture that supports group communications. What is needed is a method for supporting 2-party private calls in a distributed connection and mobility processing communication system architecture.

4. What is the prior art, and why doesn't it resolve the problem(s) or fulfill the need(s):

Motorola has filed a patent entitled "Wireless Communication System incorporating Multicast addressing and method for use" (CM4161H - Shaughnessy et al.) which describes a wireless communication system with distributed mobility and connection processing using a connectionless packet network which supports multicast addressing. It also describes how the method and multicast IP addressing is used for providing group calls. However this filing did not discuss any solution for a consistent method for providing 2 party private call in wireless communication networks

5. What is the invention being disclosed:

This invention is a method for using distributed mobility and connection processing methods and multicast IP addressing for providing a 2 Party private call in wireless communication networks. It is primarily using a statically assigned Multicast IP address as the individual connection identifier associated with every subscriber ID.

6. How does this invention resolve the problem(s) and fulfill the need(s) in a new way: Attach any drawings or diagrams you feel are necessary for clarification.

The 2 party private call using the distributed connection and mobility processing method and IP multicasting technology described in this invention simplifies 2 party private call processing greatly. The connection processing is client (subscriber) driven in the sense that connections are formed as a result of actions taken by clients rather than by connection server(s) located somewhere in the network. This can be seen more readily in descriptions of various aspects of the invention. A diagram of the preferred embodiment network is given below: (conf'd)

7. Date of conception REDACTED and if applicable, date first built (or written) and successfully tested: none

8. Product(s) this invention may be used in: Digital trunked systems, X-Zone, AeroLon, future iDEN architectures

9. Date the first offer for sale was made for a product incorporating this invention: none

10. Date the first disclosure of this invention was made outside Motorola without a nondisclosure agreement: none

11. Approvals: 1/Technical Staff or Patent Liaison 2/Management (both required) Signing this form attests to the fact that you understand the invention.

Name/Signature	Dept. No.	Location/Rm. #	Phone Number
1/ Gary Bruke	<i>Gary Bruke</i>	DQ503	IL02/141232
2/ Eric Zidto	<i>Eric Zidto</i>	DQ503	IL02/Rm 1242

12. Witnesses:

Witness: *[Signature]* Date: 2/13/99 Witness: *[Signature]* Date: 04 Feb 99

MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)

TAM V2.2 (Word Version)

BEST AVAILABLE COPY

MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)

**Motorola Patent Disclosure - Expanded Form**

Page 2

**13. Contributing Inventor(s):** *Patent Department will determine legal inventorship*

1) Gregory A. Dertz	<i>Gregory A. Dertz</i>	DQ503	IL02/1232	576-0159
USA	385-60-7457	3580 Persimmon Drive	Algonquin	IL 60102
Citizenship	SSN	Street	City	State ZIP
2) Michael D. Sasuta	<i>Michael D. Sasuta</i>	DQ503	IL02/1242	576-8150
USA	355-44-9869	1661 Blackburn Dr.	Mundelein	IL 60060
Citizenship	SSN	Street	City	State ZIP
3) _____	_____	_____	_____	_____
Name	Signature	Dept. No.	Location/Rm. #	Phone Number
Citizenship	SSN	Street	City	State ZIP
4) _____	_____	_____	_____	_____
Name	Signature	Dept. No.	Location/Rm. #	Phone Number
Citizenship	SSN	Street	City	State ZIP
5) _____	_____	_____	_____	_____
Name	Signature	Dept. No.	Location/Rm. #	Phone Number
Citizenship	SSN	Street	City	State ZIP

**14. What is the business impact of having a patent on this invention, for Motorola and/or competition:**

This invention helps enable a 2 party private call using a fully distributed connection and transport planes for wireless systems. Such a distributed connection plane may scale to both smaller/cheaper and larger/higher-capacity systems than traditional centralized approaches based on zone controllers, DAPs, MSCs or other similar controllers. Such distributed designs improve the system uptime and reliability and also eliminate an inherent single point of failure that may be present in centralized systems.

**15. Expanded description; list any additional details you feel would be helpful in describing the invention:**  
(cont'd)**Mobility and Registration**

Upon power up or cell change, subscribers send a location update request into the infrastructure that contains their ID and the associated individual connection identifier. As described in CM4161H, the subscriber, or the cell site on behalf of the subscriber, then sends "join" message to the local router for each of the mapped multicast network IDs (the connection identifier) to receive traffic destined for the subscriber. These network join message would use the Internet Group Multicast Protocol (IGMP). The local router, using techniques known in the art, propagates the join message to upstream router(s) as required such that the network re-configures itself to include this particular cell site local router when carrying traffic addressed to those IP multicast addresses.

**2 Party Private Call**

The subscriber sends a request for a private call to a particular Target ID. A name lookup is done using a Connection Naming Server database to determine the connection identifier associated with the target ID. After appropriate authorization and provisioning checks, the subscriber is given a grant to proceed. In the preferred embodiment, this grant would also include the connection identifier to be used for this target. The target is also notified that the call is starting for it. In the preferred embodiment, this notification is sourced from a higher level process, such as a service plane processor and contains the connection identifiers for both target and source (multicast IP addresses) for this call.

The subscriber would then send user payload traffic using that connection identifier. Alternatively, the subscriber could send user payload on an assigned RF channel which the infrastructure could then map to the correct connection identifier. Once the payload is addressed for entry into the network, the cell site would forward the user payload to the local router which would then forward the traffic into the network where it would be carried to the destination cell site that had previously registered to receive it. If the target wants to talk back to the originator, it uses the connection identifier of the call originator to send the user payload traffic. (cont'd)

**16. Additional details concerning the prior art related to this invention:****BEST AVAILABLE COPY**

MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)

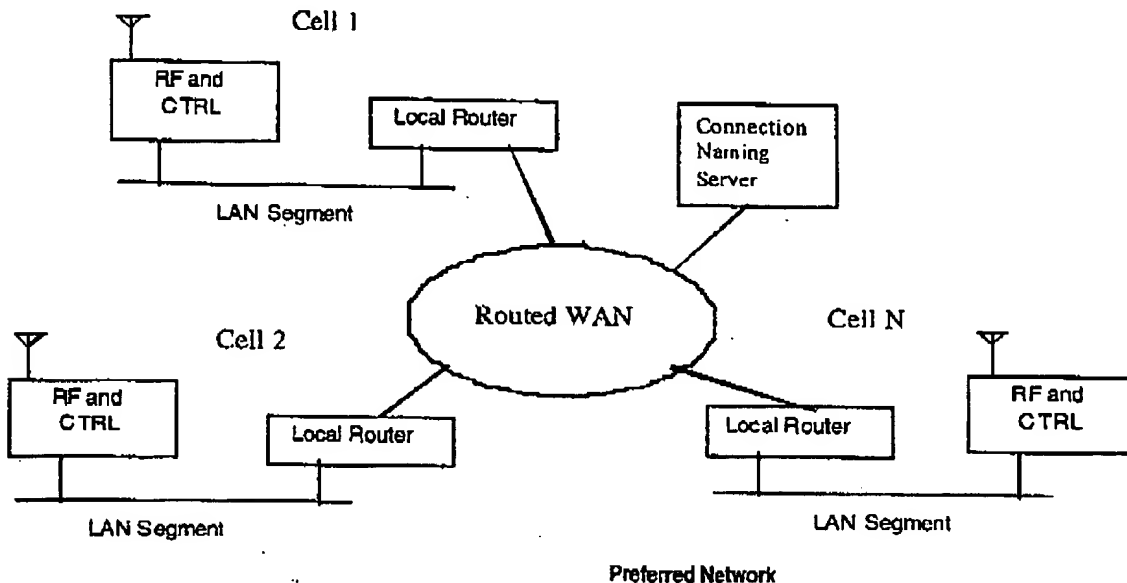
TAM V2.2 (Word Version)

MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)  
**Motorola Patent Disclosure - Expanded Form**

Page 3

Attach any backup documents or provide any other information you feel would be helpful in determining the desirability of obtaining a patent on this invention. Any attachments that are critical to the disclosure of the invention should be witnessed.

(cont'd)



Note that no mobility databases were consulted to determine which destination cell site is needed to be involved. That was handled automatically in the "leaf driven" network configuration steps.

#### Deregistration

Pruning of the spanning tree can be achieved in a number of ways. The site could periodically page for the individual subscriber being present at the site. Failure to confirm its presence will result in the site sending a IP Multicast 'leave' message to remove the site from the spanning tree. Another mechanism for pruning the tree is a background site function which detects mobile terminals attaching to a new site and then sending a 'detach' message to the site from which that terminal has come. The 'detach' message can be used to remove that terminal at the old site and sending a 'leave' message can be sent to the network. A third mechanism has each site exchange the list of subscribers attached to that site along with a timestamp that indicates the last time the site successfully interacted with the subscriber radio. This information is exchanged much like reachability information in a distributed routing protocol. When a site detects that another site has a significantly more recent interaction with a subscriber radio, it assumes that the radio has left its site and a 'leave' message is sent to the multicast router.

In these ways, logical connections are controlled by the client which, depending on the air interface protocol in use could be either the base site acting on behalf of the mobile terminal or the mobile terminal itself. The mobility information is inherently stored in the network rather than centralized in a single place.

This invention decentralizes the setup and maintenance of a 2-party private call and has the following desirable characteristics:

- **Fully localized resource management.** RF resources and link resources are managed in a distributed fashion. Resource unavailability or congestion is determined locally and this information is made known to the higher layer processes, either by application layer timeouts, or by direct messaging from the connection processing in each client. The higher layer application (for example the 2 party call service processing) is then able to take appropriate action, such as to busy the call.
- **No complex hierarchy of location registers (HLR/VLR) is required.** Through the use of leaf register and deregister messages, the network can constantly reconfigure itself to route voice packets to the destination subscriber.
- **No network connection setup activities required at the start of a call.** Once a subscriber or a cell site on behalf of a subscriber has joined the multicast IP address, the network is ready to route traffic to the subscriber or cell site at all times.
- **Highly scalable network design.** Unlike a centralized connection management approach which must be reconfigured as connection elements are added or deleted, the method allows the network to update itself constantly, determine new routes, and delete old ones. No manual link configuration is required. Configurations are also highly localized with each cell site having to know only about its local links

MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)

TAM V2.2 (Word Version)

MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)

**Motorola Patent Disclosure - Additional Information**

Page 4

Additional Information:

MOTOROLA CONFIDENTIAL PROPRIETARY (upon completion)

TAM V2.2 (Word Version)

2/17/97 JM Use multicast ID for location Area communication to solve problem of paging coordination, BA configuration

2/17/97 BG 2) Use M-ID for a 2-party private call to solve mobility problem. Dynamically assigned/created.

2/17/97 BGP 3) Create a group dynamically for the purpose of providing private call.

2/17/97 SK 4) Enhancements to DNS to support dynamic group creation using DNS to translate Talkgroup ID to M-ID (describe CUS I/F) or cellular

1/20/97 MS 5) distributed connection control for trunked radio environment.

3/14/97 MS 6) dynamic go-to-channel upon reception of traffic. allocation of (cores wanted) channel triggered by appearance of traffic requires battering limits while setup

3/14/97 MS 7) delay after sending 1<sup>st</sup> prime pump packet before sending subsequent packets (could be voice, ctl.)

MS 8) implement group communication using globally known multicast ID with receive join

\* Motorola Confidential Proprietary \*



3/21/97

SK 9) channel overbooking, transport suspension/resume

JM 2/11/97 algorithm to resolve reception of traffic from 2 sources destined to single subband channel. (give priority to most recent source)

K 2/11/97 to prevent decoder corruption by processing data from 2 or more sources

5/6/97

JM 11) when all channels/resources are completely allocated at a site

the controller "leaves" all in-use groups not assigned to channels to prevent overloading of site link.

JM 12) 11/14/97 use of multiple, alternate group registration books to <sup>see</sup> of

allow for quick & efficient switching of "joined" groups <sup>bulk</sup> <sup>USMP</sup>

2/17/97

BGP 18) onboard signaling of characteristics of voice streams in

framed radio system

priority, preemption, decoder type, emergency

2/24/97 End-to-end, not just subband control signalling across air IF

SK 19) Distributed algorithm for mobility updating within a location area

6/18/97 MS 20) Receiver directed connection plane over native ATM network

Name	Type	Size	Date Modified
01 Desktop	File Folder		9/15/2003 6:37 PM
02 Od	File Folder		8/27/2004 7:55 PM
03 4139-6_Korea.DOC	Microsoft Word Document	69 KB	3/21/1999 9:07 AM
04 4174-Presentation.ppt	Microsoft PowerPoint Presentation	11 KB	4/15/1998 6:46 AM
05 4669-Presentation.ppt	Microsoft PowerPoint Presentation	26 KB	3/13/1999 1:45 PM
06 4903.rpt	Microsoft Word Document	37 KB	12/11/2000 15:24 AM
07 4912.doc	Microsoft Word Document	29 KB	10/30/2001 3:35 PM
08 4913.doc	Microsoft Word Document	61 KB	10/30/2001 12:54 PM
09 4914.doc	Microsoft Word Document	23 KB	10/30/2001 11:12 PM
10 4915.doc	Microsoft Word Document	42 KB	9/24/2003 17:10 AM
11 4916.doc	Microsoft Word Document	13 KB	4/20/1998 10:38 AM
12 4917.doc	Microsoft Word Document	15 KB	4/20/1998 10:38 AM
13 4918.doc	Microsoft Word Document	11 KB	8/1/2005 3:23 PM
14 4919.doc	Microsoft Word Document	10 KB	11/29/2001 10:59 AM
15 4920.doc	Microsoft Word Document	12 KB	12/10/1997 9:25 AM
16 4921.doc	Microsoft Word Document	125 KB	12/10/1998 7:00 AM
17 4922.doc	Microsoft Word Document	30 KB	4/27/1998 9:53 AM
18 4923.doc	Microsoft Word Document	23 KB	8/23/1998 2:43 PM
19 4924.doc	Microsoft Word Document	180 KB	8/18/1999 5:02 AM
20 4925.doc	Microsoft Word Document	44 KB	1/20/2003 1:49 AM
21 4926.doc	Microsoft Word Document	46 KB	12/30/1999 12:07 PM
22 4927.doc	Microsoft Word Document	16 KB	8/27/1999 1:20 AM
23 4928.doc	Microsoft Word Document	11 KB	12/10/1997 4:26 AM
24 4929.doc	Microsoft Word Document	173 KB	12/30/1998 4:16 AM
25 4930.doc	Microsoft Word Document	16 KB	6/5/1998 11:31 AM
26 4931.doc	Microsoft Word Document	75 KB	8/27/1999 10:38 AM
27 4932.doc	Microsoft Word Document	7 KB	2/4/1999 11:35 AM
28 4933.doc	Microsoft Word Document	169 KB	12/29/1998 9:18 AM
29 4934.doc	Microsoft Word Document	49 KB	1/4/1999 4:56 AM
30 4935.doc	Microsoft Word Document	195 KB	4/28/1998 2:51 AM
31 4936.doc	Microsoft Word Document	2,520 KB	11/29/2001 2:41 PM
32 4937.doc	Microsoft Word Document	68 KB	11/29/2001 1:56 PM

**BEST AVAILABLE COPY**

*Voice Call Set-up*

---

## 5 Elementary Functions

---

Most of the requirements in this section are applied to both ASTRO and Dimetra systems. Any requirements that are applied to only one type of system, either ASTRO or Dimetra, will be pointed out accordingly.

### 5.1 Voice Call Set-up

---

#### 5.1.1 Unit to Unit Call Operation

##### FR5.1.1 The system shall support the setup of unit to unit calls.

Tracability:

This section will cover the requirements for unit to unit calls in a packet network. This section covers the all of the unit to unit call setup requirements for unit to unit calls between two mobile stations or between a mobile station and a console. The call tear down section will cover the ending of a unit to unit call.

APCO Unit to Unit calls operate in a non-PIT-ID reaccess fashion. Because of this operation, the network must be pre-configured prior to the reaccess to prevent truncation of audio. Since unit to unit calls are point to point it is possible to setup a full duplex connection on the infrastructure to allow audio to flow between the endpoints without setting up the connections on each reaccess. The full duplex connection will be accomplished by allocating two multicast address for the unit to unit private call. Each entity in the call will be a source for one multicast address and a destination for the other with the roles reversed for each entity.

The MSCs (Message Sequence Chart) at the end of this section detail the flow of information between devices in order to setup a unit to unit call.

Note: The basic call flow is being reused from the ASTRO 5.1 release. The only requirements called out in this section are those that are new to the X.4 release. Therefore, if no requirements are called out for a particular topic, the existing ASTRO 5.1 requirements will be reused.

Note: This section addresses the flow of control messages between the devices involved in a group call. The processing that occurs on the audio plane after the reception of the control messages is addressed in Section 5.4 "Audio Processing".

#### MICI Requirements

The MICI will be included in a unit to unit call only if a console is participating in the unit to unit call. For unit to unit calls involving the console, the MICI can be both a source and a destination in the full duplex network connection. The MICI can receive both an analog and a digital beginning of transmission message from the Zone Controller to establish both sides of the full duplex connection. The MICI will receive a Private Call ABOT only if the console needs to source audio and it will receive a Private Call DBOT to receive MS audio.

##### AR5.1.1.1 Upon receiving the Private Call Analog Line Beginning of Transmission message for a new call, the MICI will assign a call vocoder resource to be used to convert PCM audio into vocoded audio for the assigned call if a call vocoder resource has not already been

**ST AVAILABLE COPY**